

## Overview

The M-Navigator is designed by Ascendent specifically for marine navigation, and offers a compelling alternative to the conventional one camera system. It's revolutionary dual sensor design; comprised of a high-res thermal imager and a optical day-night zoom camera; provides imaging in virtually any environment, from heavy fog to complete darkness. The dual camera design allows an operator to have both wide angle and narrow views for unparalleled situational awareness allowing them to properly assess potential hazards, and threats at great distances with a high level of accuracy. The high-resolution optical camera provides superior detail over thermal imaging in certain climatic conditions but, like the human eye, is unable to see through non-transparent scenes such as heavy fog. These two dedicated sensors are seated on an endless 360° pan and tilt gyro-stabilized resolver, allowing them to be positioned in any direction by the operator. All these sensors are integrated into a rugged, military-grade housing to withstand the most extreme climates making the M-Navigator the clear choice for marine navigation.



## Navigation

Even the most seasoned mariner is limited by poor vision, Imagine being able to see clearly in any environment from fog to complete darkness. The M-Navigator packs a powerful payload and has two separate imagers, a thermal imager and a motorized zoom day night camera to provide unparalleled, hazard detection, threat assessment and situational awareness.

## Gyro Stabilized

The M-Navigator is equipped with state-of-the-art gyro gimbal platform that keeps the M-Navigator firmly stabilized, giving you clear images without degradation of the image typically caused by rough seas and swaying, thus making it ideal for marine applications.

## Optical Zoom Camera

The day/night CCD camera works at visible light and near-infra-red frequency and can offer significantly more detail over thermal imaging in certain lighting conditions. This high-resolution camera has a 36x motorized optical zoom lens, allowing for a zoom capability of up to 432x when used in combination with its 12x digital zoom. This is clearly superior to the conventional 26x zoom lens offered by competitors.

## Dual FOV Thermal Imager

Integrated 100mm (others optional) lens provides wide-angle view that is ideal for navigation and observation. The powerful long range lens with 2x or 4x magnification allows you to spot potential threats and hazards at great distances - to offer the best of both worlds, giving you complete situational awareness of your vessel and its surroundings in even the worst conditions from heavy fog to complete darkness.

## **Pan-Tilt Resolver**

The heavy-duty PTZ driver is designed for extreme performance in the most demanding applications. It implements brush-less motor technology for endless 360° panning and micro step technology for precise .01° pan and tilt positioning. Advanced features – such as preset and auto cruise, will complement just about any existing equipment by means of Pelco D and Pelco P protocols

## **Radar Integration: “Slew to Cue” (Optional)**

A superbly effective and strategic solution uses radars in tandem with pan and tilt imagers (visible CCD and thermal) and software technology to automate many of the critical challenges that the security force faces. This allows trained personnel to react in real-time and relay critical information to tactical responders. This solution automatically detects and tracks moving objects and positions the camera to focus on the object. If the tracked object moves into a blind spot or out of a camera’s view, it will be picked up automatically by another camera and tracking will continue seamlessly.

## **Intuitive and User-friendly**

Although the M-Navigator series is an extremely sophisticated imaging equipment, it is operated by an intuitive user-friendly interface with multiple control options - such as touch screen and mouse. The M-Navigator can also be controlled by a 3-axis joystick and can be operated by any individual without prior training.

## **Remote Connectivity (Optional)**

View all your cameras instantly and remotely, and control them through the internet in real time from anywhere in the world using ARMS (Ascendent Remote Management Software) with your laptop, iPhone or Android device. Because internet is often limited to low bandwidth satellites, Ascendent’s DVRs and IP cameras can record at one resolution, stream at another, and have integrated VBR and CBR to manage the amount of data and bandwidth that is used by each camera individually to ensure smooth operation on any network. Using the Trifusion platform, you can record, view and even operate up to 64 vessels simultaneously from one NVR allowing you to manage your whole fleet from one central location over the internet.

## **Rugged Robust**

The M-Navigator is comprised of military grade precision engineered components and are manufactured using unique processes to offer absolute performance. All these components are integrated into rugged IP 67 Nema 4X enclosures constructed out of marine grade components to withstand the most brutal assaults and extreme climates (-30°C~60°C) for 24/7 operation in mission critical applications.

## Optical Camera

### Wide Dynamic Range

The Navigator-M camera incorporates advanced backlight compensation technology that dramatically improves camera dynamic range by 128 times, resulting in accurate reproduction in extreme high-contrast-lighting environments. The camera captures the same image twice – first with a normal shutter speed, and then with a high shutter speed. The dark areas captured at normal shutter speed and the bright areas captured at high shutter speed are then blended into one image using an advanced DSP LSI, lending superb images.

### High-Resolution Images

Combining a newly developed DSP with a 1/4-type EXview HAD CCD, this camera achieves a high horizontal resolution of 540 TV lines and output amazingly clear, and detailed rich images with accurate color reproduction.

36x Optical Zoom (432x with Digital Zoom) Not only does this camera offer high resolution, it also has a 36x 3.4-122mm optical motorized IR corrected zoom lens, with additional 12x digital for a total zoom of 432x.



1x



36x

### Automatic AE response

The Navigator-M is equipped with a Slow AE response function that automatically slows the rate at which camera exposure levels change. This rate can be set up to 32 times slower than Full-Auto AE or Priority (shutter/

iris) modes are selected. This function allows for monitoring areas in which lighting conditions change abruptly. For example, if the camera is used to monitor the flow of nighttime traffic when vehicle headlights are pointed directly towards it, the camera's exposure level is reduced slowly. This gives the ability to identify important details; that are often overexposed by the headlights; such as the car's license plate or the driver's face.

### Multi-Line On-Screen Display

Up to eleven lines with 20 characters per line can be displayed on the monitoring screen using VISCA commands. Users can freely display captions on the screen such as monitoring location, camera name, and alarm messages - providing operators with a user-friendly interface.

### Auto MICF (IR filter)

Mechanical IR Cut Filter (MICF) to deliver optimal images in both day- and night-shooting applications. At a set level of darkness, the IR-cut filter is automatically disabled (ICR ON) and the infrared sensitivity is increased. At a set level of brightness, the filter is automatically enabled (ICR OFF). The IR-cut filter automatically activated depending on the ambient light, allowing the capture of images in a variety of lighting conditions.



No Backlight Compensation



Backlight Compensation: On



Wide Dynamic Range: On

## Thermal

### The Science

Unlike optical systems, which like the human eye requires light, thermal imaging uses infrared electromagnetic radiation 900–14,000 nm wavelengths (heat) to produce images. All objects that are above -213C emit infrared radiation, the amount of radiation emitted is proportional to the temperature of the objects and thermal imaging detects these minute temperature variations and thus accurately reproduces the scene.

### Marine Night Vision Navigational System

Since all objects emit infrared radiation a thermal imager is able to “see” the environment regardless of lighting conditions. Thermal imaging has significant advantages over traditional Night Vision Devices (NVDs), such as near infrared lasers (NIR) light intensifiers. A thermal imager gives clean undistorted vision in complete darkness and has the ability to see through smoke and fog - making it the only choice for marine navigation.



## Applications

### Navigation

Thermal imaging unlike optical systems can also see through light fog, haze and smoke. These conditions do reduce the distance of the thermal imaging but it will still give enough notice to avoid collisions in even the worst climatic conditions giving you complete confidence even in less than ideal scenarios.

### Hazard Detection

Thermal imagers are extremely effective for marine applications. Thermal imaging has the ability to detect debris objects in the water before they are a threat to prevent potentially catastrophic collisions. Naturally it also helps you steer clear of vessels, shipping lanes, buoys, bridges, and other obstacles commonly found in marine applications.

### Search and Rescue

The biggest risk with working at sea is falling overboard, every year, numerous people die due to hypothermia after falling overboard. When some one falls overboard - even in water above freezing - they can get hypothermia in less than 14 minutes, which can result in death. Finding someone as quickly as possible is crucial to his or her survival. Humans produce a lot of heat (37°C) they are easily picked up by thermal imaging.

### Security

Nowadays all vessels are tempting targets. Whether it's a yacht, fishing or military vessel, they are all subject to robbery, kidnapping and terrorism. While radar systems can detect approaching objects, they are unable to provide details outside of the approximant size. The M-Navigator renders actual visual confirmation with a high level of detail so you properly assess threats and avoid potential disasters.

36x Optical Zoom Module	
Lens	F=3.4mm (WIDE) to 122.4mm (TELE), F1.6 to F4.5
Zoom	36x optical 12x digital 432X total zoom
Angle of View	57.8° (WIDE end) to 1.7° (TELE end)
Minimum Illumination	1.4 lux (F1.6, 1/60s NTSC, 1/50s PAL), 0.1 lux (F1.6, 1/4s NTSC, 1/3s PAL), 0.01 lux or less (F1.6, 1/4s NTSC, 1/3s PAL, ICR ON)
Resolution	540TVL
FLIR Thermal Imager	
Type	FLIR Tau Uncooled Microbolometer
Image sensors	Focal Plane Array (FPA), uncooled Vanadium Oxide microbolometer 7.5Hz NTSC, 8.3Hz PAL 320x240 resolution (optional 680x480)
Picture Elements	324(H) x 256(V) pixels (optional 680x480)
Scene Temperature Differential	-40 to +75 C
Thermal Lens	100mm 6.2°x5.0°
Lens options	80mm, 60mm, 50mm, 35mm 18mm
Spectral Response	8-14 micron
Thermal Sensitivity	<75 mk, <50 mk f/1.0
Features	White hot, black hot and false color
Communications & Presets	
Presets	optional: Up to 8 presets accurate to less than 0.1° (micro step technology)
Preset tours	optional: auto-scan, random scan, left/right limitation, power-up action, Self-diagnostics,
Home Position	Yes (preset 1 or tour)
Communication	RS485 / RS422
Control Protocol	Pelco P / D standard
Cue to Slew	optional
Mechanical	
Drive Unit	Integral pan/tilt brushless motor drive micro step, pan and tilt
Pan angle and speed	360° continuous pan   Variable speed: up to 60°
Tilt angle and speed	-90° to +30° minimum
Speed Control	Closed loop electronics
Preset Accuracy	Better than 0.1
Proportional P/T to Zoom position	Yes: Automatic adjust speed with zoom in for accurate pan tilt zoom
Physical	
Construction	IP 66-IP67 Marine grade (optional Nitrogen filled)
Viewing Window	3mm tempered flat glass (optical) & germanium glass (thermal) (Bullet proof optional)
Standard Colors	White, (others optional)
Weight	17KG depending on mode and options
Environmental	
Operational Temp.	-30°C to +60°C   -36°F to 140°F temperature controlled heater & blower)
Environmental	IP66, NEMA 4X Outdoor Weather Rating
Electrical	
Input Voltage	10-32VDC, 360W peak, 60W normal
Power Consumption	Max 140W Max, (heater on)
Available Options	
Mounting	Standard
IP-Pro server (With X4 software)	converts camera into IP camera to distribute video over wired or wireless networks
Viewing window (Optical)	Bullet Proof Glass
Optional Imager	Cooled Thermal imager
Video Analytics	Virtual Fence, Object Removal, Objecting Counting, Auto Tracking, Unattended Baggage,
Thermal Zoom	2x or 4x Thermal Zoom